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PATENT
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IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: Risto KUOSA Conf.:
Appl. No.: NEW Group:
Filed: July 15, 2004 Examiner:
For: TARGET SYSTEM

L E T T E R

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

July 15, 2004

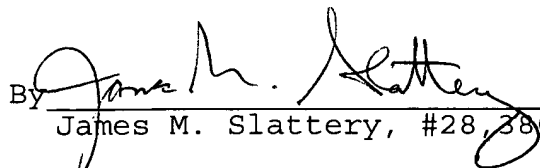
Sir:

The PTO is requested to use the amended sheets/claims attached hereto (*which correspond to Article 19 amendments or to claims attached to the International Preliminary Examination Report (Article 34)*) during prosecution of the above-identified national phase PCT application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 103902 PJ/HA		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) FOR FURTHER ACTION	
International application No. PCT/FI03/00014	International filing date (day/month/year) 09/01/2003	Priority date (day/month/year) 17/01/2002	
International Patent Classification (IPC) or national classification and IPC F41J7/04			
Applicant HONESTAS OY et al.			



1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 7 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 18/08/2003	Date of completion of this report 12.02.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Spinelli, V Telephone No. +49 89 2399 2903 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/FI03/00014

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-5 as received on 19/01/2004 with letter of 16/01/2004

Claims, No.:

1-9 as received on 19/01/2004 with letter of 16/01/2004

Drawings, sheets:

1/3-3/3 as published

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/FI03/00014

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-9
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-9
Industrial applicability (IA)	Yes:	Claims	1-9
	No:	Claims	

2. Citations and explanations
see separate sheet

Part V.

- 1.1 Document D1=US-A-3 064 976 shows (see fig.1-4 and column 3, lines 16-line 47) a target system provided with a pop-up target, said system comprising:
 - a target 98 overturnable by an impact and an actuating mechanism 110-126 for moving the target 98, said target being connected to the actuating mechanism by a pivot structure 40 and said actuating mechanism comprising a lifter for lifting the target to an upright position and an electric motor 54 for moving the lifter,
 - a vertical rail system 110 and a carriage part 112-126 vertically movable along it by the electric motor, said pivot structure being arranged on said carriage part, the lifter being a supporting lifter device 126 against which the target falls when hit and which, when the carriage is lowered, lift the target to an upright position substantially by utilizing the movement of the carriage and the inertia of the target.The only remaining novel measure envisaged by the target system claimed in claim 1, being that the target system is portable: however such a feature alone, cannot support at least the inventive step of your application (in that respect no configuration of said a target system had been therein suggested in order to render it portable).
- 2.1 Dependent claims 2-9 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, as they could be easily desumable from the content of the above passages of document D1, simply and straightforwardly applicable to the subject of claim 1 and of customary practice in the field.
- 2.2 A similar reasoning can be formulated in view of document D2=US-A-164 0954 (see fig.4,5 and column 3, lines 27-52) or in respect of document D3=US-A-4 979 752 (see fig.5-8; column 2, line 58-column 3, line 11): the subject-matter of claims 1 to 9 is not inventive with regard to the prior art disclosure of document D1, D2 or D3: relevant claims 1 to 9 are contrary to the requirements of Art.33(3) PCT.
3. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1, D2 is still not mentioned in the description, nor are these documents identified therein.

TARGET SYSTEM

The present invention relates to a target system provided with a pop-up target as defined in the preamble of claim 1.

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Target systems with pop-up targets designed for light infantry weapons comprise a metallic target, which falls down when hit by a bullet, and an actuating mechanism for actuating the target, i.e. for lifting it up again and moving it. The actuating mechanism may be protected by a shield plate placed
10 in front of it. To control the actuating mechanism, a control apparatus provided with a computer may be connected to the actuating mechanism. Hits can be detected e.g. by using a hit detector arranged in conjunction with the target.

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The actuating mechanism may be electrically operated, but it may also be operated pneumatically. A drawback with pneumatic target systems is their large size, which means that moving them e.g. for transportation requires transport equipment, and in addition, they often have to be immovably installed. Moreover, in connection with relocation of pneumatic systems, e.g. the pneumatic hoses and protection against fragments have to be renewed.

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An electrically operated target system provided with a pop-up target is disclosed in US patent specification 4,732,394. The system described in this specification comprises a vertical protective flange on the front side and another, horizontal flange behind it. The target is hinged at the upper edge of the vertical flange,
25 and when hit by a bullet, it swings backwards into a horizontal rest position. A main shaft driven by an electric motor is mounted behind the protective flange. Mounted with a clutch mechanism on this shaft is a target raising arm, which, when the target is in the backward position, swings from its rest position upwardly and turns the target to an upright position.

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The system disclosed in the above US patent specification is relatively complicated. Moreover, it is relatively weak in construction e.g. because of the welded joints used in the target, so it will easily break and therefore does not tolerate hard use.

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US-A-4,979,752 discloses a target range apparatus for rifle and handgun targets having a knock-down target supported on a target base moveable on a

support frame between an upper, exposed position and a lower, hidden position. The target is pivotally attached to the target frame for movement between an upright position and a knock-down position. An air cylinder moves the target base upwardly against a pair of springs which, when the air cylinder is disabled, return the target base to the lower position. A reed switch senses movement of the target to the knock-down position and disables the air cylinder. Upon movement of the target base to the lower position, a reset arm returns the target to its upright position. The apparatus further includes a support frame embedded in the ground and a target base on which is pivotally mounted a target that in the preferred embodiment is an animal silhouette.

The problem of the prior art as shown in US-A-4,979,752 is the heavy and bulky construction of the apparatus, especially as the actuating means include an air cylinder and springs.

The object of the present invention is to overcome the drawbacks of prior art and to achieve a new type of target system provided with a pop-up target and actuated by an electric motor, which system is of very durable design and is additionally of modular construction.

In the target system of the invention, the target is attached to a carriage which moves on upright guide rails and is driven by an electrically-operated actuating mechanism. When the carriage is driven up, the target is in an upright position and visible to the shooter. When the shooter hits the target, it falls down and disappears from view. The electric motor draws the carriage down, with the result that the target hits a lifter and rises to an upright position again. The carriage remains in the low position hidden behind a protective armour, ready to raise the target again.

The features of the target system of the invention are presented in detail in the claims below.

The target system of the invention is very simple and durable, especially because welded joints have been eliminated from the parts subject to stress, thus achieving a durable construction. In addition, the target system of the invention is of light weight, so it can be portable, and no special transport equipment is needed for relocation of the target system. Thanks to the modular

construction, individual parts are of light weight, typically below 20 kg, and e.g. broken or worn parts can be replaced in a rapid and simple manner. Thus, if necessary, a single person can move, assemble and disassemble the target system.

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Moreover, the target system of the invention makes it possible to implement a reactive and relocatable target system that can be used e.g. with a large variety of portable-firearm calibers.

10 In the following, the invention will be described in detail with reference to and example and the attached drawings, wherein

Fig. 1a presents an oblique rear view of a target system according to the invention,

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Fig. 1b a front view of a target system according to the invention without front armour, and

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Fig. 2a – 2d present a target system according to the invention in different positions.

The target system presented in Fig. 1a and 1b consists of five main components: a target 3, a carriage 2, guide rails 6, an electric motor 1 with levers 4, 5 and a frame 7. The operation of the system is controlled by a control unit (not shown) provided with a computer. The target 3 is a steel plate impenetrable to a bullet.

The motor 1 located in the lower part of the apparatus moves the carriage 2 along a pair of vertical guide rails 6 by means of levers 4, 5 connected to it. The target 3 is hinged at its lower end on the carriage by horizontal shaft 8 provided in the carriage and a transverse horizontal hole in the lower edge of the target. The levers 4, 5 are connected to the rotating axle 10 of the motor 1 and to a pivot pin 11 at the lower edge of the carriage. In addition, the levers are connected to each other by a pivot pin 12. The motor 1 and the guide rails guiding the carriage may be fixedly mounted on the frame 7.

In position A (Fig. 2a), the carriage 2 is in its low position and the target 3 in an upright position but hidden behind a front armour 15. The carriage 2 is raised up by the motor 1, thus bringing the target to position B (Fig. 2b) so that it can be shot at. If the target 3 is not hit, then it is lowered along with the carriage 2 back to position A. If the target 3 is hit, then it falls down to position C (Fig. 2c), where it is supported by a support part 13. The overturning is registered by a sensor connected to the control unit.

When the carriage 2 is lowered to position D (Fig. 2d), the target 3 hits a lifter 14, which, powered by the motion of the carriage and the inertia of the target, returns the target 3 to an upright position, and when the carriage 2 reaches the low position, the system is again in position A. The length of the rails 6 is so chosen that, in position A, the target 3 is completely hidden behind the front armour 15.

The support part 13 and the lifter may be solid or flexible. The support part 13 is located in a position where the translation and rotation of the target 3 are simultaneously cancelled out. The functions of the support part 13 and the lifter 14 can also be integrated in a single component.

In the high position, the target is not strictly upright but slightly forward inclined. This is a stable position and the target can not be overturned e.g. by the wind.

As described above, the target system implements the following three functions: target emerging into view, target disappearing from view, and immediate feedback from a hit as target is overturned or the like.

The system consists of distinct modules that can be replaced with new ones when necessary. The target 3 may also consist of two parts 16, 17 attached to each other e.g. with bolts 19, of which parts the upper one is a target part 16 and the lower one a mounting part 17, which has a slot 18 in its upper edge for the target part and in its lower edge a hole 9 for a shaft 8 as mentioned above.

The motor 1 used as a power means can be easily carried along and, when necessary, a likewise portable accumulator can be used as a power source.

It is obvious to the person skilled in the art that different embodiments of the invention are not limited to the example described above, but that they may be varied within the scope of the claims presented below. The electric motor may also be a linear motor, in which case no lever arms are needed.

CLAIMS

1. Target system for light infantry weapons provided with a pop-up target, said system comprising:

5 a target (3) overturnable by an impact and an actuating mechanism for moving the target (3),

said target being connected to the actuating mechanism by a pivot structure (8,9), and

10 said actuating mechanism comprising a lifter for lifting the target to an upright position,

wherein the actuating mechanism comprises a vertical rail system (6) and a carriage part (2) vertically movable along it, said pivot structure (8,9) being arranged on said carriage part, and

15 wherein the lifter is a supporting lifter device (13, 14), against which the target falls when hit and which, when the carriage (2) is lowered, lifts the target to an upright position substantially by utilizing the movement of the carriage and the inertia of the target,

characterized in

20 that the actuating mechanism further comprises an electric motor for moving the carriage part (2) along the rail system (6), and
that the target system is portable.

2. System according to claim 1, **characterized** in that the supporting lifter consists of a support part (13) and a lifter part (14) as separate parts.

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3. System according to claim 1 or 2, **characterized** in that the supporting lifter is solid or flexible.

30 4. System according to claim 1 or 2, **characterized** in that the supporting lifter is disposed at a position where the translation and rotation of the target (3) are cancelled out simultaneously, or close to such a position.

35 5. System according to claim 1, **characterized** in that the target (3) consists of two parts (16, 17) attached to each other by fastening elements, the upper one of said parts being a plate-like target part (16) and the lower one a mounting part (17) provided with a pivot structure (8,9).

6. System according to claim 5, **characterized** in that the upper edge of the mounting part (17) is provided with a slot (18) for the target part.

5 7. System according to claim 1, comprising a substantially plate-like protective armor (15) on its front side, **characterized** in that the rail system (6) extends to a height such that the target in its low position (position A) is completely hidden behind the protective armor.

10 8. Target system according to claim 1, **characterized** in that the system is of modular construction, consisting of detachable, e.g. replaceable parts, which are joined together without welded joints or equivalent.

15 9. System according to claim 8, **characterized** in that the target (3) consists of two parts (16, 17) attached to each other by fastening elements, the upper one of said parts being a plate-like target part (16) and the lower one a mounting part (17) provided with a pivot structure (8,9).